

REMARKS

Claims 10-25 and 30 are currently pending. Claims 1-9 have been canceled without prejudice or disclaimer thereto. Claims 10 and 30 have been amended to better define the claimed subject matter. Additionally, the specification has also been amended to reflect measurements involved in the method of the invention being carried out in the near infrared region. Support for these amendments can be found on page 9, lines 3 through 10 and page 10, lines 13 through 16 which describes the invention being carried out in the near infrared region. The above amendments to the specification and claims have been made to conform to the teachings on page 9, lines 3 through 10 and page 10, lines 13 through 16. Accordingly, no new matter is introduced by way of these amendments.

Reconsideration, a withdrawal of all rejections, and a Notice of Allowability are respectfully solicited.

I. Specification

The Office again objects to the specification as not written in such clear and exact terms as to enable any routineer in the art to practice the invention in its best mode. In summary, the Office alleges that invention cannot be a single infrared (IR) absorption spectrum for a compound and that such values cannot be employed to determine the concentration of a compound.

Applicants have amended the specification to comply with the teachings on page 9, lines 3 through 10 and page 10, lines 13 through 16, which disclose the invention being carried out by employing near-infrared spectroscopy techniques.

In the near-infrared region, absorption spectra may correspond to energies of various substances. In support of this, Applicants submit herewith

an excerpt from "Handbook of Near-Infrared Analysis", ed. D.A. Burns and E.W. Ciurczak, Marcel Dekker, Inc., (1992), pp. 7-11. A Supplemental Information Disclosure statement is submitted herewith along with a Form 1449 making this article of record.

Applicants believe that this issue is moot, and respectfully request that the Office withdrawal this objection.

II. 35 U.S.C. § 112

Claims 8, 10-25 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement. The Office alleges that the specification does not adequately explain what the first and second reference energies of the absorption spectra of the cryogenic liquid and impurity are, and how it is possible to measure the concentration of the impurity in the sample by using the ratio of these two "reference energies" without any parameters from the sample spectrum involved in the equation.

Applicants respectfully traverse each and every aspect of this rejection. As stated above, the invention encompasses using near-infrared techniques to detect trace materials in cryogenic liquids. Thus, it is now believed that this enablement rejection is fully addressed. A withdrawal of this rejection is therefore respectfully solicited.

The Office alleges that Claims 8, 16 and 24 recite compounds defined by their vibration frequencies in Hz, which, according to the Office, is not a conventional way for defining compounds¹. Further, the Office alleges that these features are not adequately supported in the specification.

Applicants respectfully traverse each and every aspect of this rejection. Firstly, the Office offers nothing, absent subsection opinion, as to why defining

¹ Claim 8 was canceled in Applicants' response dated 12-22-03. The absence of this claim is reflected on the cover sheet of current Office Action.

compounds by vibrational frequencies is non-enabling. Applicants respectfully submit that the Office's allegation is contrary to controlling case law as stated above which mandates that the Examiner must accept Applicants disclosure as being objectively enabled. See e.g., *In re Marzocchi & Horton*, 169 USPQ 367 (CCPA 1971)

"The only relevant concern of the Patent Office under these circumstances should be over the truth over any such assertion. The first paragraph of § 112 requires nothing more than objective enablement. How such a teaching is set forth, either by the use of illustrative examples or by broad terminology, is of no importance.

As a matter of Patent Office practice, then, a specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented *must* be taken as in compliance with the enabling requirement of the first paragraph of § 112 *unless* there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support."

In re Marzocchi & Horton, 169 USPQ 367, at 369 (CCPA 1971)

Secondly, these recited features do have adequate description in the specification. Applicants direct the Office's attention to page 6, lines 3-5 of the specification.

Claims 1-25 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. The Office states that Claim 1 recites "a method for identifying impurities in a cryogenic liquid"; however, the Office alleges that its steps comprise measuring the spectrum of at least one impurity and confirming the presence of this impurity in the sample. Although Applicants believe that these claims as recited previous to this amendment fulfill the requirements of 35 U.S.C. § 112, second paragraph, the claims have been amended to recite the method being one that identifies and quantifies impurities in a cryogenic liquid. (emphasis added). Such amendment is not made in view of the prior art. A withdrawal of this rejection is therefore respectfully solicited.

III. 35 U.S.C. § 102

Claims 1-5, 7 and 9 are rejected under 35 U.S.C. § 102(b) as being anticipated by Moulson et al. "Monitoring of Dopant and Impurity Concentrations in Liquid Argon by Infrared Spectroscopy", *Nuclear Instruments & Methods in Physics Res., Section A: Accelerators, Spectrometers, Detectors, and Associated Equipment* (1992), A320(1-2), 277-2 ("Moulson"). The Office alleges:

"Moulson teaches 'monitoring of dopant and impurity concentrations in liquid argon by infrared spectroscopy' (Title) by measuring IR spectra of cryogenic argon (Figure 2), an impurity (volatile organic compound having CH bond, ethylene) alone (Figure 3a) and impurity in the cryogenic liquid (Figure 3b) in a spectrum range $400\text{--}4000\text{ cm}^{-1}$ (2500-250 nm) (Figures 1-3) in a flow cell with a pressure drop between 0.85-1.05 bar ($\sim\text{lb/in}^2$) (page 278, right column) and confirming the presence of the impurity by comparing the spectrum with the reference spectra of pure argon and ethylene. The cell was originally designed to be combined with a detector used to study the ionization characteristics and electron mobilities of doped liquid argon solutions [7], so that IR analysis of the solutions could be performed *in-situ*."

Applicants respectfully traverse each and every aspect of this rejection.

It is respectfully submitted that Moulson does not anticipate the present invention. "For a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference". *In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990) citing *Diversitech Corp. v. Centure Steps, Inc.* 7 USPQ2d 1315, 1317 (Fed. Cir. 1988). As discussed in detail hereinbelow, Moulson does not identically disclose every recited element of the claims in question. Accordingly, Moulson does not anticipate such claims in accordance with 35 U.S.C. § 102.

As now set forth in the claims in question, Applicants' invention relates to a method for identifying and quantifying impurities in a cryogenic liquid by employing light in the near infrared region to measure various absorption

spectra. Spectra corresponding to absorption energies may be used to determine the concentration of the impurity in the cryogenic liquid sample. Moulson differs from the method of the invention in that it exclusively discloses liquid phase infrared spectroscopy as a technique for monitoring dopant and impurity concentrations in liquid argon (emphasis added). No suggestion is made to employ near infrared spectroscopy in the manner recited by Applicants in the claims in question. Accordingly, Moulson cannot anticipate the claimed invention.

Moulson is directed to sampling and analyzing impurities in an on-line fashion. Notwithstanding any assertions by the Office pertaining to the alleged in-situ disclosure of Moulson, Applicants respectfully submit that such disclosure is non-enabling and thus does not anticipate the claims in question.

"A Bruker IFS-66 FT-IR spectrometer with a spectral resolution of 0.25 cm^{-1} was used to collect the spectra. The IR beam was obtained from a medium-infrared Globar source and received by an external, liquid nitrogen-cooled-mercury-cadmium-telluride detector. Spectra were collected and analyzed using OPUS/IR version 1.2 software [6].

Samples were analyzed in a cryogenic cell with volume of 1.00 l. The cell was originally designed to be combined with a detector used to study the ionization characteristics and electron mobilities of doped liquid argon solutions [7], so that IR analysis of the solutions could be performed in situ. For the present studies, however, the cell was detached from the detector, surrounded by 25 layers of aluminized Mylar and mounted inside a vacuum cryostat of its own."

(emphasis added)

As is evident from the above passage, Moulson does not enable one skilled in the art to utilize the detection system in an on-line fashion. "To constitute an anticipatory reference, the prior art must contain an enabling disclosure". *Chester v. Miller*, 906 F.2d at 1576 n.2, 15 U.S.P.Q.2d at 1336n.2 (Fed. Cir. 1990). Since Moulson does not provide an enabling disclosure, it cannot be considered an anticipatory reference for the purposes of 35 U.S.C. § 102. A withdrawal of this rejection under 35 U.S.C. § 102(b) is therefore respectfully solicited.

IV. 35 U.S.C. § 103

Claim 6 is rejected as being unpatentable over Moulson. The Office alleges:

"While Moulson does not specifically teach fluorinated hydrocarbons as cryogenic liquids, it would have been obvious for anyone of ordinary skill in the art to apply his method to analyze purification of such compounds, because various applications of e.g., freons require their purification, and Moulson's method is obviously the most convenient for determining their purity."

Applicants respectfully traverse each and every aspect of this rejection.

As argued above, Claim 1 is patentable over Moulson. It is submitted that Claim 6 which depends from Claim 1, is also patentable over Moulson. Thus, Claim 6 cannot be viewed as obvious in view of the teachings of Moulson for the reasons stated herein. A withdrawal of this rejection under 35 U.S.C. § 103(a) is therefore respectfully solicited.

V. Conclusion

The points of the Office Action being addressed in full, a Notice of Allowability is respectfully requested.

Respectfully submitted,

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